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ARENT FOX KINTNER PLOTKIN & KAHN, PLLC  
1050 Connecticut Avenue, N.W., Suite 600  
Washington, DC 20036-5339

EXAMINER

LEO, LEONARD R

ART UNIT PAPER NUMBER

3744

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/728,117

Applicant(s)

PARK ET AL.

Examiner

Leonard R. Leo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 10, 12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-9, 11, 14, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 2 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of the species of Figure 4b and the sub-species of Figure 5b in the reply filed on November 1, 2004 is acknowledged.

Claims 10 and 12-13 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species and/or sub-species, there being no allowable generic or linking claim.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "serpentine structure" in claim 15 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 5, 9, 11 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 3, the claim is indefinite. The claim seeks to limit claim 1 by reciting structure that is not previously claimed. The recitation of “free from any condensate drainage slot on an external surface of its flattened tubes or on a central portion of said oblique louver fins” in lines 3-5 implies the structure(s) are positively recited in claim 1, which they are not. The claim seeks to broaden the limitations of claim 1, which recites “each of said evaporating and condensing section consisting of a plurality of fluid supply flattened tubes ... a wick structure,” by reciting “free from any fluid pumping wick” in line 7.

Regarding claim 5, it is unclear what “heat pipe” is being recited.

Claim 9 recites the limitation "the multi-channeled wall" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 11, the claim is indefinite. The claim seeks to further define the limitations of claim 1, which recites “upper and lower fluid supply headers,” by reciting “flattened tubes ... are horizontally positioned” in lines 2-3.

Regarding claim 17, the recitation of "said vapor line has a evaporating section and condensing section with the OLF fin" is not clearly understood and indefinite. Claim 17 recites the limitations "the OLF fin" and "the side oblique angle" in line 3. There is insufficient antecedent basis for these limitations in the claim. The claim appears to be a literal translation into English from a foreign document and is replete with grammatical and idiomatic errors. Furthermore, the claim seeks to broaden the limitations of claim 1, which recites "*oblique* louver fins," by reciting "the angle of attack  $\beta$  of the louver fin is set to  $-90^\circ \leq \beta \leq 90^\circ$ " in line 7. By definition, oblique means an angle that is not  $0^\circ$ ,  $90^\circ$  or  $180^\circ$ .

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 11, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadota et al in view of Beales et al and Haslett.

Kadota et al (Figures 5 and 11) discloses all the claimed limitations except oblique louvers and a wick structure.

Beales et al discloses a heat exchanger comprising a plurality of flattened tubes 20 (Figure 1) attached with a plurality of oblique louver fins 42 cut at an angle of attack  $\theta'$  relative to a main gas flow for the purpose of increasing louver length and depth, and improving air flow (abstract).

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Haslett discloses a heat pipe comprising an evaporating section and condensing section having a plurality of channels 14-19 and wicks 22 for the purpose of improving the fluid transport for heat transfer.

Since Kadota et al and Beales et al are both from the same field of endeavor and/or analogous art, the purpose disclosed by Beales et al would have been recognized in the pertinent art of Kadota et al.

Since Kadota et al and Haslett are both from the same field of endeavor and/or analogous art, the purpose disclosed by Haslett would have been recognized in the pertinent art of Kadota et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Kadota et al oblique louver fins for the purpose of increasing louver length and depth, and improving air flow as recognized by Beales et al, *and* employ in Kadota et al wicks 22 for the purpose of improving the fluid transport for heat transfer as recognized by Haslett. The “whereby” clause is believed met by the similar structure of the combination of Kadota et al, Beales et al and Haslett.

Regarding claim 3, as best understood, the evaporating section 3a (lower) and condensing section 3b (upper) in Figure 5 of Kadota et al are similar in structure.

Regarding claim 4, the number of fluid pumping wicks as taught by Haslett is believed to be as desired.

Regarding claim 5, as best understood, Kadota et al discloses insulation 50 on the vapor pipe 34b.

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Regarding claim 6, there appears to be not structural limitation. The liquid pipe is believed capable of being subcooled.

Regarding claim 7, Figure 11 of Kadota et al discloses a fluid path having rectangular cross-section similar to applicant's Figure 7A.

Regarding claim 11, the wick 22 in Figures 7, and 11-12 of Haslett is read as "I-shaped."

Regarding claim 14, the similar wick shape of Haslett is believed to function in a manner similar to applicant's claim.

Regarding claim 17, as best understood, Figure 15 of Beales et al discloses the angle of attack  $\theta'$  of the louver fin 42 is about  $18^\circ$ . Figure 11 of Beales et al discloses the side oblique angle  $\gamma$  is about  $10^\circ$ .

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadota et al in view of Beales et al and Haslett as applied to claims 1, 3-7, 11, 14 and 17 above, and further in view of Ishida et al.

The combined teachings of Kadota et al, Beales et al and Haslett lacks a micro-grooved or micro-finned surface.

Ishida et al discloses a heat pipe comprising an evaporating section (Figure 3, left side) and a condensing section (Figure 3, right side); pipe wick 20 (column 5, lines 62-67) and micro-grooves 13 for the purpose of providing a secondary wick to improve fluid transport.

Since Kadota et al and Ishida et al are both from the same field of endeavor and/or analogous art, the purpose disclosed by Ishida et al would have been recognized in the pertinent art of Kadota et al.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Kadota et al a check valve for the purpose of improving the circulation speed of the working fluid as recognized by Ishida et al.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadota et al in view of Beales et al and Haslett as applied to claims 1, 3-7, 11, 14 and 17 above, and further in view of Akachi.

The combined teachings of Kadota et al, Beales et al and Haslett lacks a check valve. Note Figure 35 of Kadota et al discloses large diameter vapor line 9a and small diameter liquid line 9b.

Akachi discloses a loop heat pipe comprising an evaporating section *H* and a condensing section *C*; and check valve 2 for the purpose of improving the circulation speed of the working fluid.

Since Kadota et al and Akachi are both from the same field of endeavor and/or analogous art, the purpose disclosed by Akachi would have been recognized in the pertinent art of Kadota et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Kadota et al a check valve for the purpose of improving the circulation speed of the working fluid as recognized by Akachi.

***Allowable Subject Matter***

Claims 2 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard R. Leo whose telephone number is (571) 272-4916. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LEONARD R. LEO  
PRIMARY EXAMINER  
ART UNIT 3744